

Hard White Wheat Variety Release: A Decision Case

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ABSTRACT

In the spring of 1998, the Kansas Agricultural Experiment Station announced that two new hard white wheat varieties (*Triticum aestivum* L., 'Betty' and 'Heyne') were available for possible release in Kansas. The varieties represented approximately a \$15 million investment by Kansas taxpayers. Approximately \$3.4 million of this investment had been paid by producer checkoff funds through the Kansas Wheat Commission. The major decision in this case was whether the varieties should be released immediately. If so, what was to be the appropriate method for the release procedures? The case summarizes four alternative options for variety release procedures, as well as both positive and negative positions of producers, producer organizations, and agribusiness firms on this decision case. The case provides the basis for discussing technology transfer and the appropriate role of a land-grant university in distributing crop varieties that have been funded by the public and private sector. Students should gain a greater understanding of how land-grant universities analyze decisions that have major implications for the structure of a state's agricultural industry.

THE Kansas Agricultural Experiment Station (KAES) announced in 1998 that two new hard white winter wheat varieties (*Triticum aestivum* L., 'Betty' and 'Heyne') were available for possible release in Kansas (K-State Research and Extension, 1998). A multidisciplinary committee (Hard White Winter Wheat Committee) within the College of Agriculture had been created to prepare a recommendation regarding release procedures (Exhibit 1). The committee's charge was to: (i) generate a release of high quality seed increase, (ii) release white wheat to the market in a way to keep red and white wheats separate to protect the value and orderly marketing of each class, and (iii) protect the research investment of Kansas taxpayers and the expense of wheat producers contributing to checkoff funds (M. Johnson, 1998, unpublished). White wheats rather than hard red wheats were increasingly in demand by domestic and international millers and bakers. A strategy of widespread adoption of white wheat by all producers was likely to be more effective than allowing only a small number of producers to market the white wheat varieties. However, there were few economic incentives for producers to switch from red wheats to white wheats. The successful adoption of white wheat varieties depended on the ability to keep the hard red wheat, which is the predominant wheat grown in Kansas, separate from the white wheat. Failure to segregate

these two classes would disrupt the marketing system and these new white varieties would likely not be adopted by producers. Lack of widespread adoption would not provide the greatest return to the Kansas taxpayer investment in the development of the varieties. The traditional method for crop variety release was a general release to enable access for all Kansas producers. This case considers alternative release procedures including two nontraditional methods that were both novel and controversial (Exhibit 2).

THE CASE¹

Kansas is the largest producer of hard red winter wheat in the USA. In response to an increasing demand for hard white wheat relative to hard red wheat, breeders at Kansas State University developed hard white wheat varieties adapted to Kansas (Paulsen, 1998). The first two varieties were available for possible release in Kansas in the fall of 1998 and represented 15 yr of research effort. Over \$12 million had been invested by the Kansas Agricultural Experiment Station (KAES) in the development of these varieties. Through a "check off" fee paid to the Kansas Wheat Commission (KWC), wheat growers had invested an additional \$3.4 million in their development. The goal was to maximize the market opportunities for Kansas hard white wheat, and provide Kansas wheat producers and taxpayers the highest return possible for their investment. A Kansas State University press release stated:

K-State has determined that release of these two varieties through conventional mechanisms may not result in the best return on investment for Kansas agriculture. The introduction of a new wheat class into an area dominated by hard red winter wheat must be done in a way that maximizes the potential for development of the white wheat industry with minimum disruption to the red wheat industry" (K-State Research and Extension, 1998).

The two new varieties were comparable to the recent hard red winter wheat varieties that had been released in Kansas for yield and baking characteristics. As expected, the white wheat varieties had a 1 to 2% improvement in milling yield over hard red wheat, since less bran could be extracted without affecting flour color. A KAES agronomist reported:

White grain can be milled at a slightly higher extraction rate to yield more flour than red grain, making each bushel more valuable. The higher extraction rate often increases the flour's content of protein, an essential component for bread making (Paulsen, 1998).

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¹ This journal uses SI units, according to the ASA-CSSA-SSSA style. Due to the circumstances of this case study, however, English units are used, either alone or along with SI units.

Abbreviations: KAES, Kansas Agricultural Experiment Station; KCIA, Kansas Crop Improvement Association; KWC, Kansas Wheat Commission; KCES, Kansas Cooperative Extension Service.

Exhibit 1. The hard white winter wheat committee at Kansas State University.

Individual	Department
Mike Boland	Assistant professor, Department of Agricultural Economics
Brendan Donnelly	Head and professor, Department of Grain Science and Industry
George Ham	Associate director, Kansas Agricultural Experiment Station
Tim Herrman	Extension grain specialist, Department of Grain Science and Industry
John Howard	Program administrator, International Grains Program
Don Kueltzow	Director, USDA-ARS Grain Marketing Research Lab
Ron Madl	Director, Wheat Research Center
Joe Martin	Professor, Department of Agronomy (Agricultural Research Center-Hays)
Rollie Sears	Distinguished professor, Department of Agronomy

Increased demand for soft and hard white wheats that could be used to make noodles had occurred in recent years, especially in Southeast Asia. U.S. wheat associates noted:

Asia is the fastest-growing market in the world, and noodles are its fastest-growing segment. Currently, Asian noodles utilize 405 million bushels of wheat and Middle Eastern Flatbreads account for another 400 million bushels. Without hard white wheat, the U.S. cannot compete with the Australians in this market (Reichenberger, 1998).

Market share for U.S. wheat exports had declined over the previous 10 yr (Exhibit 3). Meanwhile, other countries such as Australia had increased market share due, in part, to lower transportation costs and differentiated products (Exhibit 4). Australia produces only hard white wheat varieties and has differentiated their wheats by variety and quality characteristics. A spokesperson for a major U.S. grain company was quoted with reference to U.S. wheat producers:

You're (producers) being clubbed to death by the Australians on how their wheats yield more flour than U.S. hard red winter wheat (Ernst, 1998b).

The U.S. government had also used wheat as a policy instrument in recent years. For example, wheat exports to Pakistan were cut off due to the Pakistani government's testing of nuclear weapons. A spokesperson for the Washington Wheat Commission said:

If we lose this (Pakistan market), we're devastated (AgWeek, 1998).

Many believed that white wheat offered hope in regaining the U.S. share of the world wheat market. The vice-chair of the Kansas Wheat Commission said:

Hard white wheat is a tool we can use to regain our presence in the world wheat market. We can become competitors again, rather than suppliers of last resort (Reichenberger, 1998).

The question of whether the USA could become a major hard white wheat producing country was of interest to many different parties. Economists at the USDA framed the issue by asking the question,

Will HWW (hard white wheat) remain a niche product or will it become a major new class of wheat? (Lin and Vocke, 1998)

Exhibit 2. Sample magazine editorial regarding the release options (Ernst, 1998a).

"As Kansas Farmer Sees it: Red Letter Days for White Wheat" by Hank Ernst

Dear KSU White Wheat Release Team:

...K-State, you're in the catbird's seat. Preliminary interest, with few exceptions, is high in the two new hard white wheat varieties pending release. . . Your decision to offer the varieties, provided they meet muster, on a nonexclusive, identity preserved basis is shrewd. What, however, is nonexclusive means providing a proportionate share of the available foundation seed (production from 15 acres of each, far less than the more than 3000 bushels available in a typical hard red wheat release) to all who meet release criteria. Too few bushels per accepted entity? Then delay the release to increase the supply, even if it means challenging tasks of contract production and processing. The certified seed growers I know would certainly be up to the task.

Fully years ahead of the next closest state or private breeding program, you have an opportunity to go beyond the politically correct release model initially presented. While you cannot coerce players to join forces (some unexpected alliances may emerge regardless), you could craft a release scheme, which would provide a larger stake for farmers. The program's emphasis, as the predominant wheat produced shifts from hard red wheat to hard white wheat could be domestic markets, ones more readily monitored.

You already have a commitment from ABC Company to be a proactive player at any level. That's a refreshing development. Given the multinational company's status, connections, and capital base, an all-or-nothing position would not be out of the question. Should ABC Company or a firm of similar stature elect to submit a proposal and subsequently be selected as one of several recipients, they'll be stiff competition for others who also meet the requirements, but aren't as well grounded.

Make no mistake, participation by ABC Company could speed up the achievement of critical mass, a level of production that efficiently could meet the demands of the milling and baking industry. I recognize such a scenario may in time go a long-way to capture a lion's share of the world white wheat market-Middle Eastern style flat breads in Africa and noodles in Asia. Would it, however, better serve me and fellow farmers?

It's all in how you look at it. If hard red wheat is out of favor and the USA isn't a viable player in white wheats, then I won't be receiving the highest return from my farm. No, I don't think hard red wheats will go away over night, but with K-State's commitment to white wheat breeding, the reds will lag in production and agronomics. Without a value-added edge to my marketing, it will still be bushels in the bin that I've paid for, whether the wheat is white or red.

I wasn't around when Turkey Red was first seeded, but I don't intend to miss out on hard whites. I want to be involved in a producer-driven system, that, despite pitfalls beyond the farmgate, positions my further-processed products closer to the consumer. The model you develop could be used for future releases of grains for even more specialized traits. Consider your work a pioneering effort in an alternative risk management plan for farmers.

Wheat Production

Wheat is divided by the USDA's Federal Grain Inspection Service into six classes: durum, hard red spring, hard red winter, soft red winter, hard white, and soft white. Wheat class, which was determined from the kernel shape and appearance, reflected the intended end-use of the flour. Wheat was grown in 42 states with almost 45% produced in the five states of Kansas, Oklahoma, Texas, Nebraska, and Colorado (Exhibit 5). These five states produce hard red winter wheat, the major type grown in the USA.

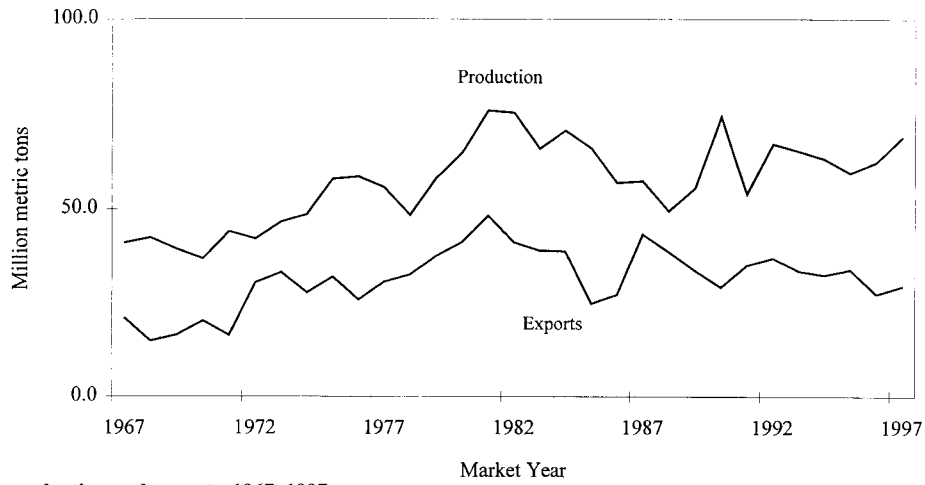


Exhibit 3. U.S. wheat production and exports, 1967–1997.

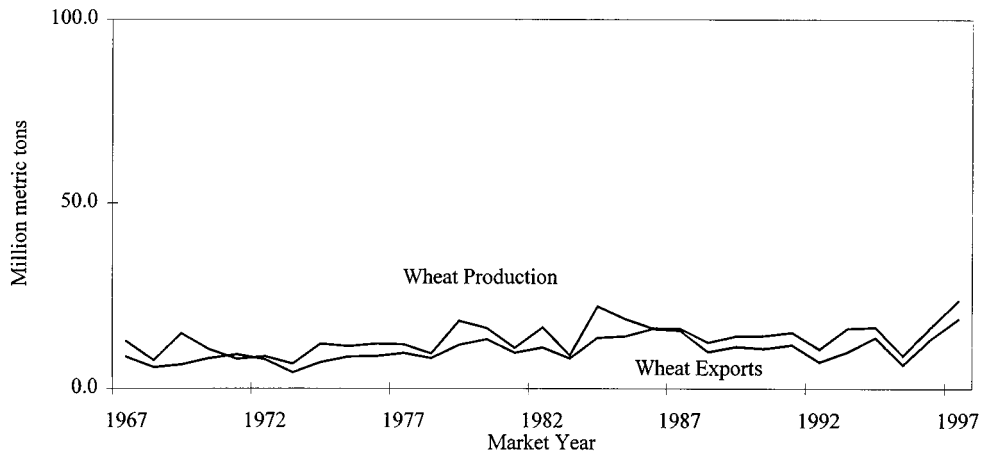


Exhibit 4. Australian wheat production and exports, 1967–1997.

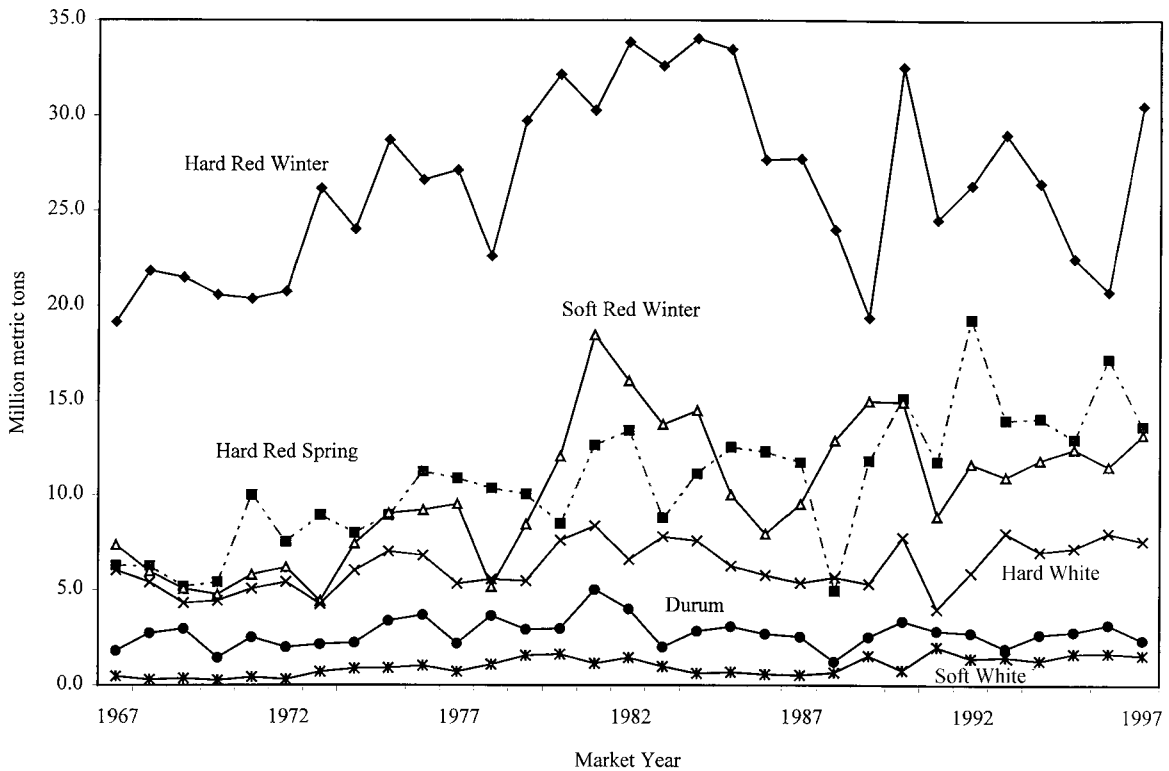


Exhibit 5. U.S. wheat production by class, 1967–1997.

Approximately 25% of the U.S. wheat (primarily hard red spring wheat) wheat production is grown in North Dakota, South Dakota, and Minnesota. Durum wheat is grown primarily in North Dakota and Montana, and white wheat was grown mainly in the Pacific Northwest. Soft red winter wheat is grown from Missouri to Ohio and in the Atlantic States (U.S. Congress Office of Technology, 1989).

The U.S. production and export of hard red winter wheat significantly declined from the early 1990s (Economic Research Service, 1998). Kansas produced more bushels of wheat than any other state in the USA, but production had been decreasing in the past decade (Kansas Agric. Statistics Service, 1998). The decline in wheat production was primarily due to low wheat prices and producers who took advantage of the 1996 FAIR Act to switch to potentially more profitable crops such as corn (*Zea mays* L.) and soybean [*Glycine max* (L.) Merr.].

The KAES had a vested interest in the hard white wheat's successful release. Due to climate and soil conditions, wheat is the primary crop grown in Kansas. Much of south central and western Kansas is relatively dry and it is not economically feasible to grow other crops. The successful introduction of a hard white wheat may provide an opportunity to expand the market for all Kansas wheat producers and this made it a KWC funding priority.

The two hard white wheat varieties released are adapted for central and western Kansas. They are comparable in performance to the most popular hard red winter wheat varieties. In addition, five new hard white lines had been advanced into elite and regional tests, and all had performance traits equal to or better than the two hard red winter wheat varieties with the greatest acreage being grown in Kansas. Three of these five new varieties were being increased on a preliminary basis for release consideration in 1999 or 2000 (Madl, 1998). This provided a short-term marketing opportunity for Kansas producers since other states were not anticipating hard white wheat varieties for several years.

Wheat Quality Characteristics

The quality of wheat characteristics may be separated into three categories of properties: physical, sanitary, and intrinsic. Physical properties included test weight, kernel damage, shrunken or broken kernels, and foreign material. These properties used U.S. Wheat Standards to grade and market the majority of hard winter wheat. The sanitary properties were contaminants that may affect wheat such as insects and pesticide residue. These properties were also used to grade and market wheat.

The intrinsic properties determine the wheat's milling and bread-making (end-use) performance. These properties include flour protein content and quality, falling number, flour yield, ash content, flour color, dough mixing properties, texture, color, and loaf volume. The intrinsic qualities had not traditionally been used to market wheat, but buyers have conducted surveys to determine geographic regions where the desired wheat quality exists. Processors, due to the speed and precision at which mills and bakeries operate, were demanding consistent quality with certain intrinsic characteristics (Herrman et al., 1995).

The market channel for most wheat starts with the country elevator. Testing at country elevators only included measuring the wheat's physical, sanitary, and some intrinsic properties (protein content). However, many of the intrinsic characteristics were not known when it left the country elevator. Wheat was shipped from local country elevators to large central storage and distribution terminals or subterminal elevators. Wheat was blended to achieve grade and test weight uniformity, and to provide the desired protein content. The terminal's primary function is storing wheat and preserving its condition before shipping it to the final customer (CAST, 1996). The wheat was likely to be milled into flour. The current industry structure did not typically provide information regarding the intrinsic qualities of wheat (other than protein) until it was milled into flour.

Traditional Release Procedures

The KAES releases wheat varieties through an alliance with the Kansas Crop Improvement Association (KCIA). The Kansas state foundation seed program director was provided seed (*breeder's seed*) after preliminary approval of a new wheat release. The foundation seed program planted approximately 100 to 200 acres (40–80 ha) of breeder's seed with the intention of producing 3000 to 5000 bushels of cleaned foundation seed.

This foundation seed was available for purchase when the KAES officially released the new variety. The KAES did not have enough land or facilities to increase seed production, which was why KCIA was used to expedite seed production. Category 1 seed growers, who were members of the KCIA, were the first to receive foundation seed. Category 1 growers must have successfully grown certified seed for a minimum of 3 yr. Because of supply limitations, foundation seed was not available to every Category 1 grower, and the foundation seed program director allocated seed quantities to the growers during the first year or two after release.

Foundation seed Category 1 growers produce registered seed that could be purchased by any producer in Kansas or neighboring states. The registered seed was planted to produce certified seed, which was available to any interested producer. Kansas Crop Improvement Association's role in this process was to inspect and ensure the integrity of all certified seed classes. Kansas State University retained control for a new variety during the first 2 yr of seed increase through breeder's and foundation seed production. Once foundation seed was distributed to Category 1 seed growers; the variety was considered released to Kansas seed growers. This standard release procedure made new crop varieties available to the general public beginning with certified seed growers and then to anyone in Kansas (Boland, 1999).

The potential problems with this method for these hard white wheat varieties were segregation and economic incentives. If the white wheat was mixed with red wheat, it was no longer classified as white wheat and lost its identity in the marketing system. To preserve the identity of the grain during the critical period of introduction, it was necessary to segregate it from red wheat. However, only a third of the storage in Kansas is on-farm relative to 75% in North Dakota (Dhuyvetter, 1999). Thus, country elevators would be responsible for class segregation in Kansas, which could

require some coordination between agribusinesses and producers.

It was thought that significant economic incentives did not exist for hard white wheats. Agribusiness firms believed that any hard white wheat premiums above the hard red wheat price were likely to be less than \$0.05 per bushel. Using Baker, Boland, and Herrman's (1998, unpublished) simulation model, Heischman (1998) found the cost of wheat segregation at country elevators to be \$0.02 to \$0.04 per bushel, depending on the number of drives, capacity, and pits. Producer adoption was likely to be based on economic incentives and the ability to rapidly segregate based on color at country elevators. This gave rise to the decision about how to introduce these two hard white wheat varieties. Should the release follow the same procedures as previous crop variety releases, or should an alternative method be used?

Kansas Crop Improvement Association

The KCIA is the official seed-certifying agency in Kansas with membership made up of 10 members representing growers and seed dealers to serve on the KCIA board of directors. These elected directors, one director elected by the Kansas Seed Industry Association, the head of the Kansas State University Department of Agronomy, and the director of the Kansas Cooperative Extension Service (KCES) governed the KCIA. The executive director served under the board and managed the day-to-day operations of the KCIA. There were close relationships between the KCIA, KAES, and the KWC.

The Kansas Certification Law authorized Kansas State University to appoint an agency to carry out the necessary functions of seed certification in the state of Kansas. The university had annually reappointed KCIA as the official state seed-certifying agency since 1937. The mission of KCIA was to "plan, facilitate and document the orderly selection, distribution and increase of pure, unique and identifiable genetic plant materials from originator to consumer, to improve and enhance the economic, environmental or nutritional well-being of the people of Kansas and the world." The KCIA worked closely with KAES and KCES, and the Kansas Seed Industry Association.

The Kansas Agricultural Experiment Station and KCES annually tested new and currently grown varieties of wheat. These performance tests included agronomic information, disease ratings, and milling and baking quality. Performance tests were published annually and made available to Kansas producers. The objective was to provide Kansas producers with unbiased performance information on varieties and hybrids likely to become available in the state.

Previous Hard White Wheat Releases

Hard white wheat was grown in Kansas by producers of the American White Wheat Producers Association (AWWPA). The AWWPA was a cooperative, chartered in 1988, which produced and marketed hard white winter wheat to markets in the Great Plains. They had hoped that producers could maximize their returns from white wheat production by forming a cooperative. The AWWPA controlled the production and marketing of an existing KAES

hard white wheat variety through an exclusive restricted release that was given to them in 1988. However, AWWPA had not managed to increase the market for hard white wheat. Wheat production had not increased beyond a few thousand acres (hectares). The main criticism of this release procedure was that economic benefits were given to relatively few producers rather than to all the wheat producers who had funded the variety's development.

To grow the hard white wheat varieties controlled by AWWPA, a producer became a member of the cooperative by purchasing common stock that cost \$100 per share. Each share of stock gave the producer the right to grow 100 acres (40 ha) of wheat. Each producer signed an agreement indicating that he or she would grow hard white wheat according to certain conditions and abide by a marketing agreement. All fields were inspected and growers were required to submit a 35-pound (15.75-kg) grain sample from each field after harvest. The AWWPA arranged for transportation of wheat that met quality specifications.

The AWWPA's goal of supplying a consistent, high quality, identity-preserved grain required additional testing costs. After wheat was harvested and stored, each lot of grain went through milling and baking tests assuring the wheat in storage was of high quality and would meet end users specifications. The AWWPA's strategy was to maximize economic benefits for its members who represented an unknown share of Kansas wheat production (Brester et al., 1996).

The number of acres (hectares) planted to hard white wheat had been growing rapidly, but total land area planted was small compared with the production of hard red winter wheat. One problem for AWWPA was matching supply with projected demand. Potential customers were reluctant to commit to hard white wheat due to lack of reliable supply assurance. Producers were reluctant to participate in contract wheat production, since they assumed more risk and relinquished some control over production. Given small economic incentives and the need to educate producers with respect to contract production, it was unclear if there was an opportunity to increase production sufficiently to assure potential customers of a reliable supply. However, AWWPA was undercapitalized and filed for bankruptcy in 1994. Their exact financial situation was unknown at the time of the varietal release decision.

A second Kansas wheat cooperative was the 21st Century Grain Processing Cooperative, which was formed in 1996. Producers purchased the right to deliver a minimum of 2850 bushels of wheat for \$5000. The cooperative used existing equity to purchase a New Mexico mill, which provided flour for the tortilla market. However, the cooperative was not yet fully capitalized.

Other wheat producer cooperatives had been successful in marketing identity-preserved wheat. Dakota Growers Pasta Company had started in 1992 through the sale of stock to producers who leveraged a \$12.5 million investment into becoming the largest private durum wheat marketing firm in North America. In January 1998, U.S. Spring Wheat Growers announced plans to build a mill in the southeastern USA after raising over \$20 million in equity. The marketing plans developed by each of these two cooperatives cost approximately \$250 000, respectively. Clearly, producers in

the northern Great Plains had experienced success with some producer-owned cooperatives. Other producer-owned cooperatives such as Harvest States Cooperatives (now Cenex Harvest States) had been profitable, but have a more diverse product line.

Four Alternative Release Procedure Options

The multidisciplinary Hard White Wheat Committee at Kansas State University had identified four options for releasing the new hard white wheat varieties: (i) use the current release program, (ii) implement a restricted release program, (iii) initiate a managed public release program, or (iv) delay the release for 1 yr so that KAES would increase seed production.

The current release program provided the most equitable allocation of economic incentives to producers in Kansas. However, the current method of public release did not consider impacts on the industry due to segregation. Identity-preserved production, segregation, and marketing of the hard white wheat was necessary to ensure that the hard white wheat benefits were achieved by Kansas producers. Producers favored this option because they had invested through wheat checkoff dollars, which are increasingly becoming more important in funding agricultural research at land-grant universities. It was unclear if a nonpublic release would jeopardize the KAES relationship with the KWC and KCIA. A spokesperson for KAES noted:

“...We feel that a public release may result in handling problems, mixtures, and dilution of the two new varieties and may lead to the demise of hard white wheat in Kansas... If we were going to do a public release we should probably increase these varieties another year to produce a greater quantity of seed. This would exceed the land and seed processing capacity of the K-State system (G. Ham, 1998, unpublished).

The second option, a restricted release program, involved awarding a firm exclusive rights to produce and market these two hard white wheat varieties. This firm would decide how to produce the seed for planting and how to market the grain to end-users, while meeting the requirements for preserving the wheat's identity and providing the best return to Kansas producers. This restricted release allowed identity-preserved production and marketing plans to be developed, and implemented over some period of time. There would be a transition to a general public release if the identity-preserved production and marketing proved successful, which would ensure maximum adoption by Kansas producers. However, this plan did not necessarily involve KCIA in certified seed production, although KAES expected that certified seed growers would be part of such a plan. The spokesperson for KAES also noted:

An alternate production and product delivery system for this new class of wheat seems appropriate. We anticipate an identity preserved, nonexclusive release arrangement that will encourage all of the seed production to enter into the hard white wheat marketing channels to allow a thorough evaluation of these varieties (G. Ham, 1998, unpublished).

At the present time, KAES and KCES had already established research and teaching partnerships with two large

agribusiness firms—Cargill and Farmland Industries. It was anticipated that these two competitors would be interested in obtaining rights to these hard white wheat varieties. The KCIA had also discussed forming a third Kansas cooperative (called AGvantage IP) to market the hard white wheat variety seed. Likewise, AWWPA and the 21st Century Grain Processing Cooperative were interested in the hard white wheat varieties. A release to any of these firms might antagonize their competitors who did not obtain the seed. However, none of these firms had provided funds to KAES for hard white wheat research. There were some relationships among KCIA, AWWPA, and 21st Century Grain Processing Cooperative in that some producers and leaders belonged to all three organizations. However, none of the three firms were believed to have access to export markets at the present time. The executive director of the KCIA said:

If white wheat is a preferred food, then the benefits ought to first accrue to U.S. consumers, the taxpayers. For a producer-based group, it's the most direct way to analyze the values of white wheat (Ernst, 1998b).

The third option, a managed public release program, would award the production and marketing tasks to two or more firms or partnerships. These firms were required to use the maximum practical number of Kansas producers to plant and grow certified seed. The KAES would retain rights to production and sale of foundation seed to eligible growers, and retain intellectual property ownership. This option would maximize the number of KCIA growers in the production of certified seed, while attempting to produce and market white wheat in an identity-preserved program when interfaced with a grain marketing firm. The attractiveness of the second and third option was the potential increase in export markets by utilizing those highest bidding firms with experience and contacts in export marketing.

Finally, the KAES could decide to keep the seed and delay release for a year. During that time, KAES would increase seed production at its experimental farms across Kansas. However, this would put a great strain on the KAES system due to increased logistics and the need to rent additional land. It would also place KAES with a large amount of risk if the crop was damaged because Kansas State University is self-insured. However, this option avoided some of the problems associated with a restricted or general release.

As part of the hard white wheat release procedures, the committee recommended that producers or firms must submit a seed production plan and a marketing plan to receive the hard white wheat varieties. Further, the committee indicated that firms could work together on joint proposals. For example, a producer cooperative with KCIA members might partner with an agribusiness firm.

The Decision

In the spring of 1998, the Kansas Agricultural Experiment Station (KAES) announced that it was anticipating releasing two new hard white wheat varieties. Four options had been identified to establish release guidelines. With few economic incentives to switch varieties, it was likely that hard white wheat variety adoption would be scat-

tered across Kansas unless a marketing plan was developed to ensure widespread adoption and minimum disruption in the marketing system. A producer cooperative had not succeeded in widespread hard white wheat adoption of earlier varieties, but some lessons had been learned through that process. Kansas grain elevators were not equipped to segregate grain on a large scale. The decision to switch producers from marketing hard red wheat to hard white wheat could have long-term payoffs to Kansas agriculture due to possible increased market share. Which alternative should KAES use to release the variety to Kansas producers?

Teaching Note

Upon completion of this case, students should be able to:

1. Understand the role of producer organizations in assisting agricultural experiment stations with technology transfer and dissemination.
2. Describe the process by which crop varieties have been traditionally released to producers.
3. Describe the concerns in crop variety releases when you have multiple partners involved in funding the research.

Use of the Case

This case can be used in at least three ways. First, the case could be used for introducing students in an undergraduate agricultural science course to the process whereby new crop varieties developed by agricultural experiment station plant breeders are released to the general public. Students could understand how the process works and discuss why it is advantageous to partner with organizations such as state crop improvement associations to increase seed production. Land-grant universities are constrained by resources and many times it is easier and less expensive to use the private sector to transfer technology or new varieties to the general public.

Second, the case could be used by agricultural economics or agribusiness students to introduce the role that economic incentives have in decision making. Students would be expected to recognize that individuals can change their behavior in response to economic incentives. However, the lack of economic incentives makes adoption more difficult. Land-grant universities can provide recommendations, but without incentives, enacting those recommendations may be difficult.

Third, the case could be used in a more advanced undergraduate seminar course where students discuss topics such as ethics, decision making processes by public institutions, or public policy choices. Students could discuss the increasing role that private industry (agribusiness firms, producer organizations, etc.) has in funding research. Upon completion of that research, land-grant universities may have different parties who believe that they solely are entitled to the benefits from that research.

Approach

Extensive resources are available on the World Wide Web (a list of resources has been provided in the references). Students could work in teams whereby one individual is assigned to locate information on wheat marketing

and wheat value chain. A second student could find information on producer checkoff programs and agribusiness joint ventures, and what research is being funded. For example, in most producer organizations, funds may be used for costs such as equipment, student labor, and other variable costs. However, these funds do not pay for items such as clerical support, and other costs indirectly related to research. Kansas State University indicates that these costs comprise approximately 45% of total costs. Another student might obtain information on release procedures followed by other experiment stations.

Students could also be assigned to read the case and discuss it in class. Then the instructor could ask the students to choose a particular crop in their state. Students could be assigned to assume that the crop would be released in their own state and could prepare recommendations for release procedures. In doing so, students would be forced to find information on how crop variety research is funded in their state and how agribusiness firms or producer organizations are involved in that process.

Possible Discussion Questions

1. What role do commodity organizations and private industry have in setting the research agenda of a land-grant university? Increasingly in recent years, commodity organizations and private firms have played larger roles in funding research at agricultural experiment stations. Significant declines in federal and state funding, coupled with increasingly expensive research programs, has led to increased funding from these two groups. Commodity organizations fund research through checkoff programs whereby producers contribute a certain percentage of the total value of their grain or livestock to fund education and research on that commodity. These dollars have become more important because they fund production-oriented research such as breeding programs, livestock nutrition, pest control, and other similar research. Consequently, scientists and administrators must work with these groups if they are to continue this type of research. In recent years, there has been a push in some states (e.g., North Dakota) for more direct involvement of commodity organizations in setting the research agenda through legislative action.

2. Should private firms benefit from sharing the value obtained from research that has been funded by taxpayer and commodity organizations? Clearly in this case, the role of private grain firms is important because they will have to maintain segregation of the wheat. Producers are not able to export wheat due to cost inefficiencies, market access, and other variables related to the wheat supply chain. The logical answer is that "yes, it is OK," if it can be shown that these firms can assist producers in obtaining that value. It is far too costly for firms to completely integrate into production agriculture. Consequently, that will force firms to provide economic incentives when purchasing the wheat.

3. What are the major concerns that an Agricultural experiment station must address when releasing a new crop variety? One concern is how to ensure that the seed production takes place so that the amount of seed available to the public increases, and every person can have access to

that seed. The use of crop improvement associations assists in getting this done. A second concern is that the release of a new variety must not disrupt existing marketing and supply channels. For example, with respect to hard white wheat, grain elevators will need at least two pits so both red and white wheat can be purchased. If elevators do not have the logistical capability to segregate varieties between elevators, the variety will not likely be adopted by producers.

4. Why is the release of hard white wheat such an important decision in this case? Hard red winter wheat is the principal crop grown in many areas of Kansas. Most of the wheat in Kansas is used immediately in milling or exported rather than stored for future use domestically. So producers do not store the wheat, which might allow them to take advantages of changes in price over time. Relative to feedgrains or oilseeds, there has been little development of *value-added* wheat products. Despite the few, if any, differences in production costs or tillage practices, producers will likely be resistant to switching from red to white wheat production, unless there are economic incentives. In this case, these economic incentives are estimated to be small. Thus, the release procedure is important to avoid disruption in the marketing and supply channels and to encourage producer adoption. Currently, food and agribusiness firms had indicated that they would not be able to segregate the wheat, and while supportive of the decision to release hard white wheat, these firms believed that the release must be managed in some form. Thus, the Kansas Agricultural Experiment Station had to ensure that the maximum return on its investment in breeding research could be realized without disrupting the marketing and supply channels.

5. How was the case resolved? After much discussion by the committee, a 30-d comment period was allowed regarding the alternative release procedures. Although the comments of more than 40 individuals, firms, and organizations were overwhelmingly positive, the committee decided that Option 3 (more than one firm would receive the seed) would be the ultimate method for release procedures, because it involved more than one competitor. However, KAES reserved the right to fall back on Option 4 if no suitable proposal could be found. Three major components were needed to obtain the seed. First, successful proposals must involve certified seed growers to increase seed production, and a seed production increase plan was required. Second, successful proposals must demonstrate that the firm(s) must have access to domestic and international markets and an explicit marketing plan was required. Third, successful proposals must involve as many producers as possible. Four proposals were received (Cargill in cooperation with Goertzen Seed; Farmland Industries in cooperation with the 21st Century Grain Processing Cooperative and HybriTech; AWWPA; and a new producer cooperative formed by KCIA called AGvantage IP). Only the first proposal satisfied the requirements of the Call for Proposals. One of the partners in the second proposal (21st Century Grain Processing Cooperative) wanted exclusive rights to the seed, which was not allowed according to the Call for Proposals. The AWWPA did not have access to international markets and was not adequately capitalized. The last proposal did not have any marketing plan, which did not meet the require-

ments. The net result was that only one proposal met all the requirements. However, providing the seed to only one firm also did not meet the requirements under Option 3 that more than one firm would be given the seed. Thus, the committee faced a stalemate. Some producers were upset that the two proposals from agribusiness firms were considered despite the inability of the producer groups to market the wheat. The two proposals from producers argued that because wheat checkoff dollars were used in the development of the varieties, agribusiness firms should not be considered, and that only certified seed growers should benefit. However, this failed to consider that taxpayers had also helped pay for the development of the varieties. The KAES did attempt to determine if there was a way that the producer groups could work out an agreement with the firms that had proven marketing plans. However, no such agreement could be reached and the committee did not provide a formal offer to anyone. After further consultations with these firms and other grain handling firms, the general consensus was that although segregation might delay rapid development of the hard white wheat industry in Kansas, segregation was not viewed as a limitation. Consequently, the wheat was released using a General Release (Option 1). Note that the actual outcome of the case may or may not be revealed to the class, depending on the instructor's intent. One motivation for including the information is that students could critique the committee's recommendation. This would be important if the instructor is not very familiar with the case. Not including the information allows students to focus on the decision-making process.

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